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INSOMNIA :
ITS CAUSES AND TREATMENT.

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INSOMNIA :

ITS CAUSES AND TREATMENT.

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BY

SIR JAMES SAWYER,

Of London, Doctor of Medicine of the University ; Fellow of the Royal College of Physicians, lately Lumleian Lecturer ; Fellow of the Society of Antiquaries : of Edinburgh, Fellow of the Royal Society : of Birmingham, Consulting Physician to The Queen's Hospital ; once Professor of Pathology, then of Therapeutics, lastly of Medicine, in the Medical School : Knight Bachelor.

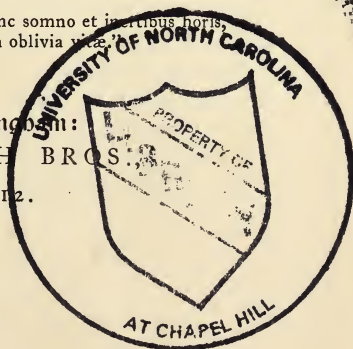
SECOND EDITION

WITH MANY REVISIONS AND ADDITIONS.

"Nunc veterum libris, nunc somno et in artibus horis,
Ducere sollicitæ jucunda oblivia vitæ."

Birmingham :
CORNISH BROS.

1912.





PREFACE TO THE SECOND EDITION.

A new edition of this treatise upon the great subject of insomnia, written from the points of view of a practising general physician, has been now determined by the exhaustion of the first edition of this book, (published eight years ago,) and by the accumulation in my hands of much additional material, such material arising in my daily notes of my practice in the prevention, analytical diagnosis, and medicinal and hygienic treatment of this complex malady. This material has been digested long and with care and assimilated into the pages of this present work. This little volume consists of the first three chapters of my "Contributions to Practical Medicine," as they stand in the fifth edition, 1912, of that book; for the convenience of my professional brethren these chapters are again offered to them in the form of a monograph upon the causes and treatment of insomnia. The third of these three chapters I have added to the other two as a summary of the practical side of the whole subject, exactly as I presented it in the article

from my pen in the sixth edition, 1911, of that admirable professional text-book, "An Index of Treatment by various writers," ably edited by my friend Dr. Hutchison, with Mr. Stansfield Collier, F.R.C.S., as his colleague, and I am indebted to the kindness of the publishers of that book, Messrs. John Wright and Sons, of Bristol, and of Dr. Hutchison, for their generous permission to include this chapter in my present volume. In these pages, then, are presented the produce of a verbatim revision of my former book, together with many additions from one's later experience, with my renewed hope of usefulness in medical practice to my professional brethren, and with my best efforts towards diagnostic accuracy and consequent therapeutic success. Perhaps the produce of this work is the more noticeable in the paragraphs about therapeutics. For facility of reference an index of the matters dealt with has now been added, for the first time.

31, TEMPLE ROW,
BIRMINGHAM, 1912.

PREFACE TO THE FIRST EDITION.

The following pages are the first two of the chapters of "Contributions to Practical Medicine," as they stand in the fourth edition, 1904, of that book. They include my lectures on the causes and treatment of insomnia, in the necessarily colloquial style in which they were uttered. For the convenience of my professional brethren, these chapters now are offered to them in a separate form in this little book. Every word has been revised and many additions have been made, by the fruits of later experience, for the sake of clearness, completeness, and precision; this has been done with hope of usefulness in medical practice, and with the aim of accuracy in diagnosis and success in therapeutics.

31, TEMPLE ROW,
BIRMINGHAM, 1904.

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I.

THE CAUSES OF INSOMNIA.*

Sleep as a function.—The appetite of sleep.—The Physiology of sleep.—Etiology of insomnia.—Symptomatic insomnia.—Intrinsic insomnia.—Varieties of intrinsic insomnia.—Psychic insomnia.—Emotional shock and prolonged mental strain as causes of insomnia.—The nervous temperament.—Lingual physallization.—Symptoms of intrinsic insomnia.—Insomnia as an obsession.—Toxic insomnia.—Copræmic insomnia.—Insomnia from tobacco.—Alcoholic insomnia.—Insomnia from tea or from coffee.—Gouty insomnia.—Senile insomnia.

THE important subject of insomnia has engaged my attention for a long time. In 1878 I delivered a clinical lecture on the causes and cure of insomnia to the students of the Birmingham Medical School, in the Queen's Hospital, and

* A Clinical Lecture : published in *The British Medical Journal*, December 1st, 1900 ; afterwards revised, re-written and enlarged, and included in the first edition of my book "Insomnia: its Causes and Cure," 1904 ; since revised with additions from my further notes of practice up to 1912.

the matter of this discourse was afterwards further published in *The Lancet*, on June 15th and 22nd of that year. This lecture I revised and rewrote entirely afterwards, embodying in it some additions from my later experience in practice, and, so enlarged, it was included in each of the two editions, of 1886 and 1891, of my "Contributions to Practical Medicine." In the autumn of the year 1900, I reviewed the subject again in two clinical lectures which I gave at my hospital, and these were issued in print in *The British Medical Journal*, on December 1st and 8th, 1900. These last lectures, in which I have tried to bring their subject up to a point at the least abreast of our latest knowledge in the principles and practice of medicine, I have revised and rewritten; and I have amplified them, especially in their therapeutic parts. So rewrought, they form the contents of the following essay. This work, done as to the causes and cure of insomnia, that is, done as to particular diagnostic and therapeutic efforts in which the skill of the physician and the resources of our art are often taxed severely, in the intricacies of a difficult, delicate, and abstruse subject, I have tried to accomplish in the spirit of the Baconian philosophy, in the spirit of that aphorism of Bacon which Syden-

ham prefixed to his renowned "*Tractatus de Podagra et Hydrope*," namely, "*Non fingendum aut excogitandum, sed inveniendum, quid Natura faciat, aut ferat.*" The result of my pleasant labours I venture now to offer to the judgment of my profession. My lectures on insomnia were delivered for the instruction of medical students in my clinical class; they are further published in these pages in the hope that they may help my medical readers in practice. In view of the conditions of the original delivery of these utterances, I have decided, in revising them, to preserve their colloquial style. Furthermore, in preparation for this present publication of these lectures, (1912,) I have revised them again, and made many additions to the therapeutics of my subject.

Sleep is a function of life, and life, in some sense, may be said to be a function of sleep, in man, in the animals which are a little lower than he is, in some sort in plants, and in everything which lives. The living organism which cannot sleep cannot live. For all beings endowed with the crowning mercy of consciousness sleep is a pleasure as well as an appetite, and it is a necessity as well as both. For these conscious beings, strung as they are in

their sentience to the most exquisite responses in the world's vast chorus of living harmonies, sleep is indeed and in truth "tired nature's sweet restorer." All the activities of the brain, and every other function of the human body, find in sleep an inseparable condition of their various energies, and of their exhibition, recreation, and preservation. For sleep to be of proper frequency and periodicity as to its recurrence, of proper duration and of proper "depth," is to make the best of a state of life in which all life's manifestations renew their powers. For sentient beings periods of rest, frequently recurring, are an inexorable necessity, and the "best of rest" is sleep.* For man, at the head of such beings, and perhaps the only of them which knows the cark of a mind's unreprieve, or the wear of "that unrest which men miscall delight," sleep it is indeed which smooths out life's fretting creases and "knits up the ravelled sleeve of care." That you may become practitioners of medicine you are students in this place of the manifold sciences of medicine in some of their chief practical bearings, mingled with the inexorable simplicities and with the endless intricacies of the art of healing. You are clinical students here of that cherished art

* Thy best of rest is sleep."—*Measure for Measure*.

of ours, an art which is of men philanthropic and of time perennial, as its lovely figure stands revealed in all its subtle and splendid details, firm and broad based upon the blended foundations of its great constituent sciences. You are students in this hospital I love of that great art of ours in clinical medicine, in its concrete application to individual cases of human suffering, no two of them indeed ever quite identical, no more than are identical a tree's waving leaves or the billows of the rolling sea. Let us press forward together, in all the absorbing zest of the pursuit which is ours, to the brightest understanding which yet there may be of the intimate nature of sleep. Let us collect, discriminate and sort the causes which make for insomnia. Let us sift and sum up all which our sciences and our art, our experience, and even our empiricism, of which last I am not ashamed, have of tried adoption for its cure. In this work your physiological training, your clinical insight, your utilitarian aim, and even your poetic fancy and your literary culture, may all find coördinated play, in the comprehension and in the verbal depiction of functions and maladies which are intricate with our lives, associate with our highest attributes, and woven in woof and warp into the very texture of all our pains and of all our pleasures.

Favoured by your kind attention, I purpose to offer you some considerations upon the vital function of sleep, and upon the conditions, causes, and cure of insomnia, based upon a somewhat long and successful experience of those subjects in practice as a physician. These subjects are certainly of first-rate importance in relation to our knowledge of the science and our practice of the art of medicine. Possibly you may scarcely be able to appreciate their relative importance while you are, as yet, only hospital students. Later in your careers, when you become engaged in actual practice among the sick, and especially when you take part in what is called private practice, often will you be confronted by the perplexities of insomnia, and often will your pleasant duty lie in successfully unravelling the causes of sleeplessness, on that soundest principle of causation and of therapeutics, *cessante causâ cessat et effectus*, and in curing insomnia by counteracting those causes, and by making their tiresome and dire-some effects to cease. I hope to be able to show you that in such happy results the science and the art of the physician may play a successful part. Like thirst and like hunger, sleep is an appetite. We may define an appetite, in the words of that astute Aberdonian, the philo-

sopher Bain, to be a craving produced by the recurring wants and necessities of our bodily or organic life.* An appetite, strictly so-called, has two characteristic marks, and these marks are strikingly characteristic of sleep; these marks are two conditions which are true to sleep—namely, its periodic recurrence and its organic necessity. We know that the natural course of a human life brings on sleep without the volition of the individual willing the event. The true character of sleep as a veritable appetite appears when it is resisted. Under such resistance the individual person experiences what is called, in metaphysical parlance, a “massive” form of uneasiness, discomfort, and pain. The will of the individual, in the presence of this uneasiness, is energetically urged to remove such discomfort and unrest, and is urged from pain towards pleasure, is urged to obtain the gratification of relief in what Bain called “the corresponding voluminous pleasure of falling asleep.”† In this imperatively urgent volitional impulse is the appetite of sleep. [Sleep is a desire; with the further characteristics of its organic necessity, and its periodic recurrence, it ranks as one of our appetites.

* The Senses and the Intellect.

† Mental and Moral Science.

The intimate physiology of sleep is a difficult subject, and the difficulties of its explanations have been the topics of much controversy, and such controversy appears to have issued from various combinations of the teachings of observation, of experiment, and of analogical and other reasoning, upon the phenomena of sleep. I do not propose to follow at length the details of this part of our subject. As a clinical teacher I must not overload your memories, but rather must I try to make easy your mental digestion. For our practical purposes I think we may understand that two distinct, but associated and related, vital changes occur in sleep. The one is some intrinsic change in those ultimate tissue elements of the brain which are concerned in consciousness; the other and "coarser" change is a diminished supply of blood to the brain, and especially to the blood vessels of the cortex of that organ. The former change is at present undemonstrable, excepting by inferential reasoning. Perhaps there is some essential and intrinsic change in the brain, and perhaps there also is some such change in the spinal cord and ganglionic nervous system, both of rhythmic occurrence, and both conditions of healthy sleep. Perhaps there is a functional depression of these parts in sleep, and especially

of the cerebral cells, arising from "an accumulation in and around them," as Sir Thomas Lauder Brunton puts the matter as to the cerebral cells in sleep, of some of the products of normal tissue waste. Perhaps for normal sleep an intrinsic change of this kind must gain the wide distribution I have mentioned. It is likely that there is in sleep a rhythmic change such as I have indicated, and that this change is sustained by the physiological effects of some of the issuants of those tissue changes, muscular and nervous, which especially occur in the active waking state of the body.

The noun sleep denotes a state of life which eludes definition excepting by description and by inference. One of the greatest of modern philologists, Noah Webster, defined the noun as repose or slumber, and the state of being as "to rest with the voluntary exercise of the powers of the mind suspended."* It appears from our physiology that, for our sleep, we must drown our cerebral cells in a kind of auto-intoxication in the ashes of our waking fires. We may usefully recall this view of the subject when we use exercise and fatigue as remedies for insomnia. The proof of the other broad change in sleep—namely, diminished blood supply to

* Dictionary of the English Language.

the brain, and especially to its cortex, rests on inference from physiological analogies, on various observations, and on the solid basis of direct experimental evidence. We must note, however, that the human brain, in its perceptive, cogitative, and volitional functions, in these great divisions of consciousness, is not the only part which sleeps. The whole living body sleeps. The changes which the event of sleep declares certainly extend beyond mere interruption of consciousness; they extend to secretion, to the action of the heart and blood vessels in the general circulation of the blood, to respiration, to "reflexes," and so extend to all the tissue modifications, and to all the other vital activities, upon which such manifold transitions depend. In order to complete your pre-cognitions of the physiology of sleep, before we pass on to consider the several conditions of insomnia and their appropriate therapeutics, I may refer your attention to the admirable accounts of these subjects to be found in the text-books of Dr. Augustus Waller* and of Sir Michael Foster.† From each of these volumes

* *An Introduction to Human Physiology.* By Augustus D. Waller, M.D., F.R.S., 2nd Edition. London, 1893.

† *A Text-Book of Physiology.* By M. Foster, M.A., M.D., LL.D., F.R.S., 5th Edition, Part IV. London, 1891.

I offer a brief quotation, which sufficiently illustrates our subject for my present purpose. On that part of his subject which is so important to us from a therapeutical standpoint—namely, the state of the cerebral circulation during sleep, Dr. Waller says:—

“Although there is no doubt that in coma—a pathological state similar in some respects to physiological sleep—the cerebral vessels are congested, the observations of Durham on the exposed cerebrum of sleeping dogs, and of Jackson on the retinal vessels of sleeping infants, are to the effect that vessels shrink in sleep, and we may therefore feel reasonably assured that the sleeping brain, in common with other resting organs, receives less blood than in its state of activity. Moreover, Mosso’s* investigations on exposed human brains afford evidence that the organ becomes more vascular during mental activity. . . .”

That sleep concerns the whole body, and not the brain alone, is well put by Sir Michael Foster. He says:—

* Professor Mosso, of Turin. In a letter which he kindly sent to me under the date June 10th, 1904, upon his receiving a copy of the first edition of this book, he made a pathetic reference to his favourite study: “Les deux derniers livres que j’espère d’écrire touchent votre sujet. C’est donc avec intérêt et reconnaissance que je vais lire votre travail et je vous remercie de cœur.”

“ Though the phenomena of sleep are largely confined to the central nervous system, and especially to the cerebral hemispheres, the whole body shares in the condition. The pulse and breathing are slower; the intestine, the bladder, and other internal muscular mechanisms are more or less at rest, and the secreting organs are less active, some apparently being wholly quiescent; the secretion of mucus attending a nasal catarrh is largely diminished during slumber, and the sleeper on waking rubs his eyes to bring back to his conjunctiva the needed moisture. The output of carbonic acid, and the intake of oxygen, especially the former, is lessened; the urine is less abundant, and the urea falls. Indeed, the whole metabolism and the dependent temperature of the body are lowered; but we cannot say at present how far these are the indirect results of the condition of the nervous system, or how far they indicate a partial slumbering of the several tissues.”

You may find an interesting and instructive employment if you follow Sir Michael Foster through his discussion of the exact state of the body, and especially of the brain, in sleep. He points out, what is now generally accepted, that an alteration of the cerebral circulation is not the whole of sleep. He judges that “ the essence

of the condition is rather to be sought in purely molecular changes," and then he goes on to suggest a resemblance between the systole and diastole of the heart and the sleeping and waking of the brain; and then he dwells on the various periodicities which may be observed in the activities of the human body, and even suggests that the fundamental rhythm of the heart may be a reflection of the mysterious cycles of the universe, while it may yet be only the result of the inherent vibrations of the molecules of its own proper structure.

If we exclude from our consideration the insomnia which is a concomitant of some forms of unsoundness of mind, and which kind of insomnia I do not propose to deal with in these lectures, you will find that absent or imperfect sleep, inability to sleep at all, or at a convenient time, or long enough, without the aid of drugs, is a frequent consequence or complication of numerous and varied conditions of disease. Etiology, as you know, is that division of the science of medicine which has to do with the causes of disease. The etiology of insomnia embraces the enumeration of all the causes of the malady. These causes are numerous, and a classification of the varieties of insomnia, upon the basis of their causal distinctions, is some-

what difficult. Let me recommend to you, for use in practice, the following classification of the varieties of sleeplessness under our consideration. It is the best etiological arrangement I can form, of the causal intricacies of our subject. It is a classification which you will find of service clinically, when you pursue the discovery of the particular causation of any given case of sleeplessness. Cases of insomnia seem to divide themselves naturally into two groups, namely, of cases of what may be called *symptomatic insomnia*, and of cases of what may be called *intrinsic insomnia*. Symptomatic insomnia attends a vast variety of morbid states, and is secondary to them, or is part of them. Intrinsic insomnia, as we shall see later on, is capable of distinct definition, and it breaks up naturally and simply into three smaller divisions, upon a causal principle of division.

As to symptomatic insomnia, pain, if severe enough, and from whatever cause arising; pyrexial elevation of temperature; frequent coughing, such as often occurs in pulmonary consumption; dyspnœa, such, for instance, as results from obstructive dilatation of the cardiac cavities, and appears to require an extraordinary vigilance of the nervous centres for the maintenance of the vital processes of respiration and

circulation—are examples of clinical conditions of disease which may prevent, shorten, or break up sleep. In the same category may be placed the insomnia which may be incidental to the extremer variations of arterial tension. High arterial tension keeps up insomnia as a cerebral irritant. Low tension keeps up insomnia by cerebral congestion. All these conditions are frequently met with in medical practice, as single causes of insomnia, or as conjoint causes of it in various combinations. In such and in similar instances the cause of the sleeplessness is obvious, and the consequential character of the insomnia—that is, its dependence upon a distinct and sufficient cause—is clear. For the therapeutic control of this kind of insomnia we may employ with success one of two curative methods, or we may employ a judicious combination of these methods, such combination being founded upon a skilled appreciation of the especial needs of each individual case. We may control sleeplessness of the kind in question either by the exhibition of remedies which directly cause sleep, that is to say, by the administration of some of the drugs which we know as hypnotics or soporifics, or we may control it by the employment of measures which combat the cause of the in-

somnia, by removing pain, by reducing the heat of fever, by quelling cough, by relieving cardiac disturbance and dyspnœal discomfort, by readjusting the balance of the circulatory forces, and so on; or by using in conjunction hypnotics and remedies addressed to the removal of the cause of the sleeplessness. In such cases of symptomatic insomnia, as in medical practice generally, you will find that it is convenient to your duties, and that it tends to the thoroughness of your ministrations, if you regard the therapeutic indications of each case from the well-known standpoints, respectively, of the *indicatio causalis*, of the *indicatio morbi*, and of the *indicatio symptomatica*. By a judicious combination of the remedies so suggested you will be able to deal successfully with cases of symptomatic insomnia. By regarding the cause of the illness with which you have to deal as a medical attendant, by regarding the various pathological processes which underlie the progress of that illness, and by regarding the symptoms of that illness, by regarding these points in turn, or together, or in various combinations, with a judicious therapeutic intention, you may arrange your remedial efforts upon a systematic and comprehensive basis.

A serviceable clinical classification of the varieties of symptomatic insomnia is given in

the New Sydenham Society's Lexicon of Medicine.* Therein the editors point out that insomnia shows disturbance of some important organs or functions, although this may not be indicated by local pain, and they cite the congestive, febrile, and asthenic varieties of the malady: in the congestive insomnia of cerebral hyperæmia, there may be throbbing of the head, conjunctival redness, objective heat of head, acuteness of the senses and wildness of the ideas; the febrile is the sleeplessness accompanying the invasion of a specific fever; the insomnia of exhaustion is that which is caused by overwork with anxiety, by excessive emotions, defective nutrition, or exhausting discharges. Their other variety, the lithæmic, coincides with one of the forms of toxic insomnia.

Now let us consider the details of intrinsic insomnia. There is a simple inability to sleep, which you will often be required to cure—a kind of insomnia which may be called for the sake of simplicity, but perhaps scarcely with strict truth, *insomnia per se*. This is a kind of wakefulness for which we cannot discover an objective or obvious physical cause; it is a kind of wakefulness which seems to depend upon an

* Vol. III., 1888, Edited by Henry Power, M.B., and Leonard W. Sedgwick, M.D.

inability of the brain and nervous system generally to adapt themselves to the conditions which are necessary for sleep. We meet with this disorder more in private than in hospital practice. It occurs mostly in persons who are members of what are known as the upper and upper middle classes. It occurs mostly in persons of high mental endowments and of neurotic temperament. The malady is of extreme importance, and, happily, if its causes be understood and judiciously corrected and controlled, there are few affections which are more within the sphere of curative therapeutics. I think I can succeed in showing you how to unravel the complex causes and discover the successful treatment of this kind of insomnia.

The causes and the course of particular instances of intrinsic insomnia present some striking differences. You must know these differences, and be ready to recognise them, for the knowledge of them clears up alike the therapeutics, the successful treatment, and the prognosis of individual cases of the malady. I have found it to be convenient in practice to arrange the different clinical varieties of such insomnia into groups, in which the cause of the affection is the principle of division. These groups I call respectively the *psychic*, the *toxic*,

and the *senile*. Let us see how these divisions work out in detail.

The brain in natural sleep is, as we have seen, relatively anæmic. The cerebral arteries, as we have seen, are more filled with blood than during sleep, when the brain is in full waking and working activity. When thought is active, the parts of the brain concerned are living relatively rapidly; they are actively receiving nourishment from the blood, and they are, too, actively ridding themselves of the waste products of their vitality. In sound natural sleep the brain is inactive, excepting those parts of it which are concerned in the processes of organic life. In sleep the blood flows to and through the brain in streams which are smaller and gentler than in the waking state. The cells concerned in thought, volition, and feeling are not expending energy; they are renewing it and storing it—they are resting. Any cause, however little we may be able to trace the details of its operation, which directly prevents a repose duly deep of a sufficient number of those brain cells which are the organs of conscious thought and of perception, will render sleep impossible; relative cerebral hyperæmia is an inseparable consequence of such activity, and such relative cerebral hyperæmia becomes a concurrent, but

subordinate, cause of insomnia. Here there is progression through a vicious circle of two terms, in which the impulse of the morbid movement springs from the cerebral cells. So we see that there are causes of insomnia which we may fairly regard as acting primarily in sustaining cerebral activity, and with it, and in consequence of it, relative cerebral hyperæmia, which hyperæmia becomes a contributory cause of the cells keeping awake.

In some other cases of intrinsic insomnia I think we may regard the malady as arising primarily in a perversion of the cerebral blood supply. [Any cause which prevents the brain from becoming relatively anæmic in a sufficient degree for sleep will produce sleeplessness.] Any ingested agent which sustains cerebral hyperæmia, or any pathological change which impairs sufficiently the contractility of the smaller cerebral arteries, may prevent wholly, or in part, the occurrence of such a degree and extent of cerebral anæmia as is required for the production of sleep, and without which sleep cannot be.

So there are causes of insomnia which act primarily in exciting and in sustaining a relative cerebral hyperæmia, and with it and in consequence of it a cerebral activity which is wakeful. Here there is again a progression


through a vicious circle of two terms, but one in which the impulse of the morbid movement springs from the cerebral blood vessels. In conscious cerebral activity, which, as we have seen, is a complex condition of at least dual causation, in which thought certainly implies increased blood flow, and increased blood flow sustains thought, perhaps it may be considered that we cannot, with strict accuracy, allow initiative precedence to either of the causes which are essential to the common result. In medical reasoning there is little which is so difficult as tracing effects up to their causes, and there is little so easy as the invention of causes for effects. Let this caution make you wary. Take due pains in practice to analyse the causation of each particular case of intrinsic insomnia. When you make such analysis you will find that in some cases of sleeplessness, as in the psychic group, undue and protracted cerebral activity is the primary vice, and that in others, as in the toxic and senile varieties, relative cerebral hyperæmia is the initial error, and wakeful cerebral action its direct consequence.

Our present consideration of our subject has advanced to a point at which we may usefully illustrate our generalizations with some

sketches of particular instances of intrinsic insomnia, as they are met with in medical practice. In a case of psychic insomnia some sudden emotional shock of a depressing kind, as grief at the death of a beloved relative, will sometimes be found to have produced at once persistent sleeplessness, which sleeplessness will only yield to carefully directed therapeutic procedures. Again, prolonged mental strain, in all its varied phases, is a common cause of the psychic variety of insomnia. [Our patient may be a student preparing for an examination. For weeks, in spite of fatigue, he may have shortened his hours of sleep that he might lengthen his time for reading; and he may have been in the habit of keeping himself awake, when he could have readily fallen asleep, by drinking strong tea or coffee, or by smoking tobacco. But he could always go to sleep at once when he went to bed, and sleep soundly, until, after some weeks of his abnormal work, with the nearer approach of the examination bringing increased anxiety as to the result of the ordeal, he found he began to sleep badly or almost not to sleep at all. He grew miserable; he could not remember what he read; he felt unfit for any exertion; and he could not face his examination. Or, our patient may be a young profes-

sional man. He has commenced practice, or rather to wait for practice, as a barrister, a solicitor, a physician, or a surgeon. He begins to find that causes or cases have not been waiting for his advent; clients or patients are "few and far between." For a time he manfully struggles on, his hope and his health sustaining him; but these at last yield under the continued pressure of new disappointments and accumulating anxieties. He may want money; his friends will give it to him readily if he will ask for it, but his pride prevents him. It is not a gift or a loan he needs; he does not want to beg or to borrow money; he yearns to earn it. And while he has been hoping and waiting, and growing sick with the failure of his expectations, he has been working early and late in his exacting studies—perhaps straining his powers in preparation for some higher examination, and, it maybe withal, adding the denial of due sleep and exercise, and so he has been wasting and wearing his psychical and physical energies, in the trust that he might thus so skill himself the more as to secure the longed-for practice. At last he has fairly broken down. He has grown thinner; he looks haggard; he is filled with groundless fears; he is weighed down with the ineffable misery of insomnia; he has headache

constantly, and noises in his ears; he thinks his memory is failing; he is dull and listless; he has been lying awake for hours after going to bed, or, waking in the "small hours," he has been unable to sleep again, and when he has slept he has had horrid dreams; and he comes to us for help because he can scarcely sleep at all, and he is possessed by the fear that he is going mad. His misery is urgent; it excludes all other joys and most other pains; it is the unspeakable misery of intrinsic insomnia, the insomnia which hangs on no solacing peg of causal pain. Here we observe particular instances in which acute or continued mental strain is the primary cause of sleeplessness. Where the shock has been sudden and severe it has been sufficient to rouse a given group of cells into persistent activity, and to produce psychic insomnia suddenly. So produced, the sleeplessness may become a persistent trouble, which yields only to judicious therapeutic procedures. In other cases, and more commonly, the insomnia has only arisen after prolonged mental strain, as that which a student may undergo in over-reading for an examination, as that of continued financial anxiety, or that of arduous and sustained literary composition. Where the shock has been sudden and severe



enough, there has resulted a persistent wakeful activity. Where the strain has been less intense, but kept up long, a monotonous group of ideas has been maintained in exhausting recurrence. In either case it would appear that sleeplessness did not occur until there arose from exhaustion partial or complete vaso-motor paralysis of the intra-cranial blood vessels; it arose when the arterioles of the brain had no longer that contractility without which sleep is impossible. In these forms of insomnia unnatural excitation of the cerebral cells is probably the initial fault. This point of view, we shall find just now, gives the best working hypothesis for our treatment.

Here I must further direct your attention to the question of the causal association of what is known as the nervous temperament with intrinsic insomnia, and especially with this psychic variety of the malady. In my experience, the subjects of the psychic variety of insomnia are mostly men, and almost invariably men of the temperament which is known in medicine as the nervous temperament. I advise you to study temperaments. Their recognition is of much value in diagnosis, in prognosis, and in therapeutics. A temperament may be defined as "that individual peculiarity of physical organization by which the

manner of acting, feeling, and thinking of every person is permanently affected," and the nervous temperament is marked by great sensitiveness and activity of the nervous system.* We have lately been too ready to ignore temperaments; our fathers studied them better and regarded them more than we do. But I shall not go to any authority for a portrait of the nervous temperament; I shall describe it to you as I judge I have found it in a physician's practice. I use the phrase nervous temperament to indicate a distinct type of outward form, of manner, of habits, of tendencies, and of personal aptitudes, physiological and pathological. Temperaments present their various types most frequently in men. Comparatively few women exhibit a well-marked temperament; but when a woman is of the nervous temperament, in her the temperament is mostly very distinct indeed. In frequent instances, two or more of the different kinds of temperament may appear to be blended in one patient; we have a compound of reciprocally modified temperaments.† A man

* A Medical Lexicon. Published by the New Sydenham Society. *Op. cit.*

† Clinically, the most marked temperaments are those known respectively by the names of bilious, lymphatic, nervous, and sanguineous.

of distinctly nervous temperament has a quick manner, if he have not a slowness which is obviously a calculated one; he is nearly always in a hurry; he is apt to talk volubly and to eat quickly; if he do not know us well, he fidgets in his hands, or legs, or face when he is speaking; he talks abruptly, earnestly, and fluently, often splitting up his phrases, or recalling and correcting them, and especially modifying qualifying words, such as adverbs and adjectives, in his anxious desire to express what he conceives to be the finest shades of truth. A man of this temperament is apt to "overdo" everything into which his feelings enter, and his feelings enter prominently into most of his doings. He is apt for hobbies; and he is often a diligent collector of curiosities. If a good man, he is likely to make a worry of his goodness; if bad, he is apt for treasons and stratagems, perhaps for spoils. When he becomes a patient, he is harassed about some trivial symptom; he has felt his heart beating, and he thereupon fancies he has some deadly cardiac disease; he thinks his memory is failing, and he forthwith imagines he is going mad. Some persons of this temperament may be known by their eyes, with sclerotics unduly exposed, their eyes showing a breadth of sclerotic between the cornea and the

upper lid. This is a sure sign, but one often absent. Lingual physallization is a name I have suggested for a constant mark of this neuro-pathic temperament. It is a condition which I think I was the first to describe, in my Lumleian Lectures.* When a patient of this sort shows his tongue in the usual way, two broken rows of small bubbles of air are to be seen in the moisture upon the dorsal surface of the organ. A row of these skirts each lateral edge of the tongue, and lies at a distance of about a seventh of the width of the dorsum linguæ from this edge, a row of bubbles on each side. The pathognomy of this appearance is unerring. How does it arise? A little emotional increase in the viscosity of the mouth's moisture, as in fear, and a little emotional increase in the mouth's movements, as of swallowing, which is a physical accompaniment of what is called tenderness, and this lingual physallization results. These causes of this natural phenomenon are true and enough. Yet other clinical signs of this temperament are to be found. For an instance, Laycock taught that temperamental signs

* Points of Practice in Maladies of the Heart. Lumleian Lectures at the Royal College of Physicians for the year 1908. Published in a separate volume in the same year.

could be made out from handwriting. As to this, the modern school of French graphology yields many points of medical suggestiveness and of usefulness in medical practice. Your elucidation of temperamental details in medical practice will develop your clinical observation and acumen. *Ars medici est in observationibus* is a maxim of our schools which was a favourite one of that excellent clinician and successful physician, the late Sir Andrew Clark, and this proverb of ours is very true in the detection of the signs of the nervous temperament.

Francis Thompson's autobiographical description of the horrors of insomnia as the neurotic feels them is perhaps the best expression of them in our language:—

“Forlorn, and faint, and stark,
I had endured through watches of the dark
The abashless inquisition of each star;
Yea, was the outcast mark
Of all those heavenly passers scrutiny;
Stood bound and helplessly
For Time to shoot his barbèd minutes at me;
Suffered the trampling hoof of every hour
In night's slow-wheelèd car;
Until the tardy dawn dragged me at length
From under those dread wheels; and, bled of strength,
I waited the inevitable last.”*

* Selected Poems of Francis Thompson. London, Methuen, 1910.

A man who has suffered much from intrinsic insomnia becomes the subject of a well-marked group of symptoms, subjective and objective. Most of them are given by certain writers amongst the signs of cerebral hyperæmia. It is probable that they mark a particular variety of exhaustion of the brain, attended by more or less of an abnormal increase of blood in the brain, and accompanied by some general prostration of the bodily powers. These concomitants of insomnia, as I have found them, I now describe to you. The patient has a dull and listless look; his eyes are wanting in vivacity; the upper lids may droop a little, and they may be slightly swollen. The complexion is sallow. There is headache; of this there are two kinds, which either co-exist or occur separately. The commoner variety of headache is a dull pain felt over the whole of the vertex, together with a vague and widespread feeling of oppression in the head; the other is a sharp, shooting pain, which comes on suddenly, and usually in single flashes, and which gives the idea of a knife being driven through the head from one temple to the other. Occasionally the patient feels giddiness momentarily; this may cause a false step, but it never lasts long enough to give rise to staggering. The skin of the scalp,

especially near the sagittal suture, may be tender. There are noises in the ears, in one or in both, usually of a low-pitched whistling character. This tinnitus aurium may come on suddenly, and without apparent cause, as when the patient is talking quietly, or it may only arise when the patient's attention is more closely occupied, as in writing a letter or in casting up figures. A striking sign in the group of symptoms we are considering is a slight impairment of hearing. The patient may be unaware of it, but those with whom he lives have noticed that he often asks them to repeat what they say to him because he could not quite catch their words. He may also complain of seeing spots before his eyes—little cobwebby black lines, *muscæ volitantes*, which come and go and float about, or, perhaps, bright, bluish, phosphorescent-like specks, phosphenes, which seem fixed for a moment, one before each eye, and which only appear when he first directs his eyes towards an object. There are usually some abnormal sensations in the skin; not formication, such as is apt to arise in organic nervous disease, but a sharp, transitory, and isolated prickling, as of the movement of a single pin, which lasts only for an instant, and affects either the limbs or the trunk, mostly the former.

There may be a peculiar twitching of muscles. This is a state of involuntary muscular movement of which I have made original and independent observation, and of which I know of no previous description, either oral or written. It is not a vibratory tremor, like that of progressive muscular atrophy, nor is it a contraction of a whole muscle, or of a group of muscles, such as arises in true convulsion. But, while the patient is sitting still, a considerable part of a muscle becomes the subject of rapid clonic movements, and these are wholly independent of his volition. These movements mostly occur in one of the lower extremities, and they are rarely sufficient to move the position of the limb; they usually affect the lower part of one vastus internus, and last for about a minute. The patient can feel the movements by attending to the affected part, and he can also feel that the muscle moves by applying his hand to it. In such a case there is often also an unnatural and painful sensitiveness to external impressions. The patient craves for quiet. A bright light troubles him. Noises, the sight of moving objects, touches, as of the hand of a friend upon his shoulder, annoy him. There is not an increased sensitiveness to external impressions, but impressions which are enjoyed or unnoticed in health become irritants.

We may note here that insomnia is caused in many instances by a fear of insomnia having become an obsession, an abiding "dread." A person who thinks he is not going to sleep, and who has an exaggerated fear, which may pass to an unreasoning terror, of the consequences of sleeplessness, is likely to be kept awake by this state of his mind. A determination to keep awake is a sure provocative of sleep; but a fear of keeping awake is a sure dispossant to insomnia. We shall see later on how this fear may be combated successfully.

In the toxic variety of intrinsic insomnia the cause of the sleeplessness acts primarily upon the blood vessels of the brain, giving rise to some degree of arterial hyperæmia. Cerebral vascularity, especially the arterial supply of the cortex of the brain, is maintained at such a height and so long by some poisonous agent that conscious cerebral activity—that is, wakefulness—is an inevitable consequence. Such a poison may be introduced into the body from without, or it may be a product of diseased processes arising within the body itself. Of course, I use the word "poison" in a restricted sense; I do not mean something which kills, but only something which produces abnormal manifestations in the living body. The poisons with which

we have here to do are not in their lethal doses, or milder noxious agents which produce certain distinct and abnormal manifestations. Tobacco, alcohol, tea and coffee are the external poisons which most frequently cause sleeplessness; internal or autogenetic poisons causing intrinsic insomnia may be found in certain waste products of tissue metamorphosis which accumulate in the bodies of gouty persons, or in the bodies of persons whose kidneys are inadequate. Of this kind is the form of sleeplessness which has been described as lithæmic insomnia, but of which an excess of uric acid in the blood is probably not the only toxic cause. Such insomnia may be characterised as, "sleeplessness from a gouty condition, or defective excretion of effete matters, produced by excess in eating and drinking; when sleep is obtained it is fitful and stuporous."* But we must remember that toxic insomnia from insufficient excretion of waste products does not arise necessarily from dietetic excesses, but may be due to some failure of the excretory powers.

Possibly, as our knowledge of auto-intoxication shall increase, some other forms of auto-intoxication may be found to cause intrinsic insomnia, and the exact details of the causal

* Medical Lexicon. *Op. cit.*

chain may be made out. Clinical experience has suggested to me that insomnia may sometimes be a neurosis having its origin in toxic absorptions by the gastro-intestinal mucous tract. Certainly intrinsic insomnia is found in practice to come and go with constipation and the relief of constipation. The explanation of such association of symptoms may be a toxic one. The word "copræmia" is coming into medical use, to signify a kind of poisoning of the blood by noxious principles derived from retained fæces. Sallowiness of the skin, what may be called fæcal anæmia, anorexia, "biliousness," and asthenia mark this condition, and, in some cases, intrinsic insomnia may be added to its characteristics. In copræmic insomnia we have to deal with a form of sleeplessness which presents well-marked causal antecedents, and which yields brilliant results in practice when its causal foundations are removed, by the application of a judicious selection from the large repertory of therapeutic resources at our disposal for the cure of coprosthesis, as that condition arises in the various moods of habitual constipation.*

* I have dealt with the great therapeutic subject of the treatment of habitual constipation in my "Contributions to Practical Medicine," 5th Edition, 1912.

With regard to the smoking of tobacco, many a man cannot sleep either sufficiently or soundly simply because he smokes excessively. Smokers often find by their own experience that they sleep badly if they smoke more than their usual quantity of tobacco, or if they smoke tobacco of a stronger kind than that to which they are accustomed. So a smoker who suffers from insomnia may find the cure of his sleeplessness in the restriction of his smoking. He need not give up, nor shorten, nor change his work, nor need he change his "surroundings"; if he restrict his smoking, he soon sleeps well. So also as to snuff-taking in relation to insomnia. Men of nervous temperament, or men into whose temperament there enters a distinct and considerable blending of the nervous element, often smoke tobacco or take snuff largely. The consumption of tobacco by smoking or snuff-taking stimulates the cerebral circulation. This stimulation, if pushed to undue limits, induces cerebral vaso-motor debility, with a consequent tendency to persistent conscious thought, and so to wakefulness.

Similarly, too, the drinking of alcoholic beverages causes insomnia. The man who drinks to commencing drunkenness mostly sleeps soundly, if not well. But many a so-called

moderate drinker knows that he sleeps badly if he take a little more than his usual quantity of wine, for instance, after dinner, or even his usual quantity of some unusual wine. Alcohol, when it passes from the stomach to the blood, flushes and dilates the smaller blood vessels, especially those of the brain; if such a condition be maintained, sleep is disturbed or wanting. We have all seen clinical examples of the insomnia of delirium tremens: the patient cannot sleep because the lesser arteries of his brain are weakened, perhaps paralysed, by alcohol, and sleepless cerebral activity is the inevitable consequence. Far short of what is usually called alcoholism, we often meet with cases of insomnia in which alcohol alone is the cause of shortened, interrupted, and disturbed sleep. The patient may pride himself upon his moderate use of fermented stimulants, and he may be wholly ignorant of the cause of the sleeplessness for which he consults us. We fail to find any sufficient psychic cause for his insomnia; but if we take away or diminish his wine or his grog, or induce him to consume it before the evening, we find he soon begins to sleep well.

Again, the effects of the consumption of tea and coffee in causing sleeplessness are well known. This effect is so obvious that patients

usually remedy it for themselves. As you well know, tea in the form of an infusion and coffee in the form of an infusion or of a decoction are used generally in civilised countries as the daily beverages of the people. Tea leaves contain an alkaloid which has been called theine, and coffee seeds contain an alkaloid which has been called caffeine, and theine and caffeine have been shown to be identical; both these leaves and these seeds contain besides certain oily principles. With regard to tea, what may be called its physiological action appears to depend on the joint action of its theine and of the volatile oil which tea leaves contain. What is called green tea is produced by drying the fresh leaves on a heated iron plate until they become shrivelled; while black tea is manufactured by placing the leaves in heaps and allowing them so to lie while they undergo a kind of fermentation, after which they are dried. Green tea and black tea are powerful cerebral stimulants, exciting the mental faculties and the cerebral circulation, and tending to prevent sleep. Coffee, too, is a cerebral stimulant and antisoporific. It is sometimes used in medicine for these properties, to counteract the effects of opium and of its derivative narcotics, and of other narcotic poisons. Some people are extremely susceptible

to the sleep-preventing effects of tea or of coffee ; others, by use, do not feel such effects, even when considerable quantities of those beverages are consumed. In all cases of bad sleeping you should make sure that tea or coffee is not taken to excess, neither near bedtime.

In gouty persons, quite apart from secondary wakefulness caused by their gouty pains, there may be some intrinsic insomnia, of a kind which is probably toxic in its causation. So, also, intrinsic insomnia may afflict a patient whose kidneys are failing, who has renal inadequacy. In such cases it would seem to appear that the accumulation in the blood, in consequence of deficient excretion, of the products of tissue-metamorphosis causes a general restlessness which disposes to insomnia. Insomnia so caused is not severe, and it is rarely complete. There is slumber rather than sleep. There is restlessness, perhaps some excessive irritability to certain external impressions, short and broken sleep, and what may be called superficial sleep, rather than prolonged wakefulness. In this connection I may remind you that you should observe the tension of your patient's pulse. A patient may complain that he sleeps very badly, that he lies in bed awake for some hours and has great difficulty in "getting off"

to sleep, that he sleeps lightly, awakens often, and dreams much. You may find he has a pulse of increased and high tension, with accentuation of the aortic second sound, and with the cardiac first sound lengthened and muffled, perhaps reduplicated, at the apex of the heart. In a case of chronic kidney disease there may be also the physical signs which mark the characteristic cardiac hypertrophy which accompanies chronic contracting nephritis, and is an effect of it or a concurrent effect of a remoter pathological cause. Insomnia in such cases is likely to be due to the maintenance of a state of high tension in the cerebral arteries, the tension in them not falling sufficiently for prolonged, deep, and dreamless sleep. In practice you will find the causation of many of these cases of insomnia, and you will find some therapeutic indications, too, in the signs of the gouty diathesis or in the discovery of albuminuria. Here I must give you a caution, which you may usefully remember in practice, namely, never accept a patient's statement that he is gouty without the establishment by your own observation of facts sufficient for such a diagnosis. Insomnia which is purely nervous may be wrongly attributed to gout, and depletory measures of treatment may be adopted when corroborants are really indicated. The diagnosis

of gout is a diagnosis for which patients often have a tender affection, and I am afraid it is a diagnosis which is often erroneously made, and wrongly handed on through a succession of credulous advisers. Do not fall into the frequent error of making a diagnosis of gout because a specimen of your patient's urine which is brought to you shows a deposit which to the naked eye is like unto grains of cayenne pepper, and which deposit is made up of aggregated crystals of uric acid. Such a sediment may be only an innocent result of an acid fermentation, such as frequently arises in urine after its voidance, without any pathological significance whatsoever.

As I have already told you, there is a senile form of intrinsic insomnia. Remember that senility is a term of which the primary absoluteness is largely modified in particular cases by relative qualifications. Some persons are senile early, others only later. With much truth it may be said that a person is not as old as his years, at least in a pathological sense, but as old as his arteries. You may perhaps have observed amongst your friends that an exaggerated appreciation of the merits and value of early rising often increases as age advances. The broken and short sleep of many old persons is mainly, if

not entirely, the result of senile degeneration of the smaller cerebral arteries. It is indeed a good and joyful thing in the progress of the medical art, that the prevention of this lethal change is coming more and more within the range of successful physiological prophylaxis, as I shall point out to you in a later part of this present communication. In such degeneration those blood vessels are less elastic and less contractile than in health, and a degenerative weakening of their walls often leads to their permanent dilatation; the smaller cerebral arteries, so changed by a pathological process, are physically unable, by reason of a diminution of their resilience and of their contractility, to adapt themselves normally to such a condition of relative arterial anæmia as is of the essence of healthy sleep. The tendency of this condition of the blood vessels of the brain to prevent, to lessen, or to interrupt sleep is probably to a great extent counteracted, in many cases, by the cardiac feebleness which so frequently, and which, within certain limits, it may be said fortunately, co-exists with senile vascular changes. When arteries are brittle, cardiac failure, within certain limits, may be regarded as a conservative lesion, in the sense that such failure tends to save from arterial rupture and the consequences of cerebral hemorrhage.

II.

THE TREATMENT OF INSOMNIA.*

No "rule of thumb" cure.—*Hypnotic drugs.*—*Risks from hypnotics.*—*Causal treatment.*—*Bromide of potassium.*—*Cure of anæmia.*—*Alcohol.*—*Carminatives.*—*Adjuvant remedies.*—*Popular remedies.*—*Rhythmic sleep.*—*Physical exercise.*—*Sunshine.*—*Monotonous impressions.*—*Bedclothes.*—*Position of bed.*—*Posture of patient.*—*Ventilation.*—*Food.*—*Cold.*—*Continued medical guidance.*—*Self-discipline.*—*Toxic insomnia.*—*Senile insomnia.*—*Counter-irritation.*—*Motoring.*—*Infantile insomnia.*—*Therapeutics of suggestion and of hope.*

THE curative treatment of insomnia consists in the successful employment of a judicious selection from a large variety of our medical re-

* A Clinical Lecture: published in *The British Medical Journal*, December 8th, 1900; afterwards revised and enlarged and included in the first edition of my book, "Insomnia: its Causes and Cure," 1904; since revised, with many additions from my notes of further practice up to 1912, especially as to practical details in medicinal, hygienic, educational and physiological therapeutics.

sources, in medicinal, hygienic, educational, and physiological therapeutics. Such selection can only be made appropriately to the complex needs of each insomniac after a diagnosis minutely analytical as to causes, idiosyncrasies, habits of life and of body, and temperaments. There is no "rule of thumb" cure for insomnia. Each case must be separately studied; the details of its cure can only be decided under competent medical advice. I shall help you all I can now in this part of our subject; but many remedial details are only suggested in practice by the exigencies of particular cases, and are only developed as the fruit of long experience in the treatment of persons suffering from sleeplessness. I shall tell you something of the use of hypnotic drugs, and of the dangers of some of them; and of drugs which may be needed which are not hypnotics; I shall try to impress upon you the importance of stopping overwork or worry, when either or both are found to be causes of insomnia; and I shall point out to you many hygienic, educational and physiological considerations which bear upon the cure of insomnia, and some useful therapeutic adjuvants which I have found helpful to that end in my practice, and which may suggest to you many other successful remedial procedures.

Do not begin to treat a patient for insomnia until your diagnosis is made, firstly as to there being present insomnia at all, and, secondly, if insomnia be present, as to the nature of the malady, and as to its cause or causes. In a recent discussion amongst physicians as to the therapeutics of insomnia my friend Dr. Hale White* rightly insisted that before attempting to treat insomnia the prescriber should assure himself of its reality, that patients often fancied or even dreamt that they did not sleep, and that a good test thereupon was remembering to have heard a clock strike.

In the treatment of insomnia you may find it necessary to exhibit some of the drugs which are known to you as hypnotics or soporifics: these are remedies that induce sleep. When you have to deal with a case of insomnia do not assume that you must of necessity give a hypnotic drug. I advise you rather to assume that you can cure a given case of insomnia by understanding its particular causation and by remedying the same, rather than by attacking the effect by dosing the patient with some hypnotic. Prescribe hypnotics only in exceptional cases; only administer such drugs when you cannot help it. Your experience in prac-

* Senior Physician to Guy's Hospital.

tice will enable you to decide, with increasing precision, when such an exceptional case is before you. Rely, whenever you can, upon an intelligent causal treatment of insomnia, combining such treatment with a judicious employment of some of the non-medicinal helpers of sleep which I am about to describe to you, if such addition to a strictly causal treatment be needed in any particular case. As a rule, the successful treatment of a case of sleeplessness follows from the discovery of its cause. In the severer forms of psychic insomnia, however, it often happens in practice that we must at once secure sleep by the action of some efficient hypnotic. I prefer either opium or chloral hydrate. By the use alone of one of these drugs we can often quickly cure acute insomnia depending upon some sudden mental shock or strain. You will find that a few nights of sound and sufficient sleep, artificially induced by the exhibition of a reliable hypnotic, will do more than anything else to restore to the brain the power of sleeping without further aid from drugs. Besides chloral hydrate and opium, and besides morphine and the other soporific derivatives of opium, the chief hypnotic drugs are sulphonal, trional, veronal, tetronal, chloralamide, paraldehyde, and the bromides, to which may be

added alcohol and affusion of the head with cold water.

For full details concerning the comparative merits and demerits of many of the newer hypnotics which we owe to the progress of synthetical chemistry, I may refer you to the admirable writings of Professor Binz.* Upon this important part of our study of the medicinal therapeutics of insomnia, I read to you a passage from a valuable paper by Dr. Richard Weiss,† upon certain pharmacological details which are here pertinent to our subject. He wrote:—" . . . The discovery was made that the cells of the cerebral cortex are more prone to alteration in their composition than are the other cellular elements of the body, and also that they contain a much larger percentage of fat. It therefore appeared reasonable to suppose that those drugs would tend to become stored up in them which have a high solubility in oil or in the brain lipid. This led to the conclusion on the part of the manufacturing chemist, that one of the qualifications of a chemical substance in-

* Lectures on Pharmacology. New Sydenham Society's Translation.

† The Synthetic Remedy to-day. By Richard Weiss, M.A., Ph.D. : paper published in *The British and Colonial Druggist*, March 22nd, 1907.

tended as a hypnotic should be a high degree of solubility in oil and a slight one in water. Thus the path was opened up for the rational preparation of substances so capable of influencing the nervous system as to induce sleep. Hypnotics may be divided into two classes: those which are capable of producing artificial sleep, and those which merely further the occurrence of natural sleep. While until comparatively recent times the only representative of either class was the chloral hydrate introduced into therapy in 1869 by Liebreich, modern therapy has at its disposal a large number of hypnotic preparations from which choice may be made according to individual requirements. Hypnotics belonging to the chloral group, such as dormiol, isopral, and viferral, have all been found to possess marked toxic effects, and are, therefore, unsuitable for the subjects of heart and kidney disease. In 1890 a second group, the sulphonal series, was introduced by Baumann and Kast. . . . The action of members of this series such as trional and tetronal is not so certain as that of the foregoing, and tolerance for them tends in some cases to be established. On the other hand, they are less toxic. The latest group is that of the urea derivatives, and is composed of such members as hedonal, neuronal, proponal

and veronal. The last-named drug has now acquired a world-wide reputation as the most harmless and trustworthy of all means for producing artificial sleep, not only when failure of the normal function occurs as the result of organic disease, but also when it is due to conditions of excitement. As regards the second class of hypnotics whose object is merely to serve as the preliminary for natural, healthy, refreshing, and dreamless sleep, mention may be made of the latest addition to this class, bromural. This substance exercises no by-effect, and, unlike those of the preceding class, no sign of toleration has up to the present been reported. The therapeutic position of this preparation is therefore situated between veronal on the one hand and the preparations of bromine and valerian on the other."

My friend, Sir T. Lauder Brunton, insists upon a well-recognised and valuable therapeutic consideration, namely, that a combination of hypnotics is sometimes more successful than any of them singly. He recommends a combination of "small quantities, such as 5 or 10 minims, of solution of opium or morphine, with 5 grains of chloral and 10 to 30 of potassium bromide."*

* A Text-Book of Pharmacology, &c.

These and other hypnotics may be variously combined to meet the indications of each particular case, according to the judgment of a skilful adviser.

Here I must warn you very plainly and very seriously of the risks which attach to the administration of powerful hypnotic drugs. Many human lives are yearly lost as the consequence of the taking by sufferers from insomnia of overdoses of hypnotics. All drugs which produce sleep as a physiological effect, and the relief of insomnia as a therapeutic action, with the exception, perhaps, of the bromides, produce stupor rather than sleep in overdoses, which deepens into the sleep which knows no waking when they are ingested or injected in larger doses still. So never allow a patient to dose himself with hypnotics. Keep the matter quite within your own secure hands, upon well-recognised limits of safety. From time to time a person who has been addicted to hypnotics is found dead in his bed upon some morning. The manner of his death is thus:—He is in possession of a considerable quantity of some lethal hypnotic. He has, say, a bottle of a solution of it. He is in the habit of giving himself a full dose of it each night upon getting into bed. One night he awakens earlier than usual, somewhat muddled,

thinks he needs a further dose, takes one too plentifully, and soon passes into the "sleep" of death. I warn you that a hypnotic of this sort should never be in the possession of the patient. If a dose of such be indicated it should be administered by an attendant, who should take away any further store of the remedy; if the patient should not sleep the attendant should be summoned, and the question of a further dose and the quantity of the dose should be decided by the attendant accordingly to instructions from the medical man in charge of the case. When the "habit" of taking a hypnotic, and especially a synthetic hypnotic, has been established for some time, an ordinary dose may cause death, and has done so: there has been defective excretion of former doses, and then a cumulative and fatally poisonous effect has been completed by the last ordinary dose. No one who takes a nightly dose of any hypnotic which might cause death in an overdose or by a repetition of doses, or even in an ordinary dose, should be without a night attendant. There are many fatal cases of this kind which do not become known to the general public.

In the less acute and more chronic forms of psychic insomnia, where the sleeplessness or wakefulness usually depends upon prolonged

worry or overwork, I employ hydrate of chloral or other powerful dormitives as sparingly as may be. They should only be used as temporary remedies, when it is necessary to secure at once a fair amount of sleep. A patient should never be allowed to swallow chloral or any other of the dangerous but valuable hypnotics whenever he feels so disposed, neither should he apportion their doses for himself; he can only safely take them under direct medical control and observation.

Another important point must not escape from view. It is this: an overworked man or woman must never be permitted to go on with his or her overwork and habitually secure sleep by chloral or by any other hypnotic. In such a case we must relentlessly aim at preventing the sleeplessness by removing its cause, instead of pursuing the illogical and precarious course, into which often a wilful and impatient patient would persuade us, of permitting that cause to continue, and of trusting to counteract or suppress the resulting insomnia, a troublesome effect of that cause, by medicine. Remember that work which prevents due sleep is dangerous work. When a man cannot sleep because he works his brain too much, we must make as a condition of our help that he stop or greatly

lessen his labour. Especially should be abstain from mental work for some hours before going to bed. In many persons the cerebral hyperæmia of severe mental toil does not fall down to the circulatory limits required for healthy sleep for several hours after the cessation of such work. But I advise you to be wisely suspicious in practice as to accepting work as a cause of insomnia. [Nature provides that disposition to rest shall follow work.] [It is mostly worry, not overwork, or it is work under wrong conditions, which makes sleep difficult.]

Whatever the cause of the insomnia, a holiday, with complete change of scene and with distinct change of activities, will often do much to cure. Great as is the curative influence of new surroundings and of new outlets for energy, in many cases of psychic insomnia we cannot, however, do without drugs. Potassium bromide is by far the best hypnotic in well-nourished patients, and in the slighter cases generally. It is marvellously powerful in producing nervous calm; it is a direct brain sedative, and quite a safe one. But it must be given properly, and in full doses; after getting into bed, 30 to 60 grains, dissolved in water, should be the dose. Sometimes you may usefully combine with it some drug which will

favour the contraction of the weakened cerebral blood vessels. For this indication we may give tincture of ergot or tincture of digitalis, one or both.

In many cases of chronic wakefulness arising from prolonged mental strain, the patient is distinctly anæmic. The insomnia cannot be cured unless the anæmia be cured. The pallor of the patient's face, the lightened tints of his visible mucous surfaces, and his soft and small pulse, declare the condition of his blood. Such a person mostly feels drowsy when he is up and wakeful when he lies down. He needs hæmatinics, of which the best are iron and arsenic, singly or combined. His diet must be generous, containing plenty of fish, meat and eggs. For such a patient an alcoholic dormitive is often the best hypnotic; its form and dosage need peculiarly precise prescription and careful supervision.

The prescription of alcohol as a remedy in disease is often difficult and sometimes dangerous. To many people a "nightcap" of toddy is a superfluous, perhaps hurtful, luxury. It gives, however, perhaps better than anything else, rest and sleep to the worried brain of feeble persons whose blood is poor. I find that alcohol is the best hypnotic in many cases of

chronic psychic insomnia, when the patient is worried and weakly, sorrowful and anæmic. In such a case some food and a carminative may be combined happily with an alcoholic stimulant, as in a good old caudle which Dr. Kitchiner called his *balsamum vitæ*, made up of a drachm each of tincture of cinnamon and of powdered white sugar, mixed with the yolk of an officinal egg and two ounces of madeira, for a dose upon getting into bed.* Beer was the hypnotic relied upon by the great Lord Chancellor Bacon, who appears to have been a psychic insomniac. His contemporary Aubrey relates of him, "his Lordship would often drinke a good draught of strong beer (March beer) to-bed-wards, to lay his working fancy asleep: which otherwise would keepe him from sleeping great part of the night."† We may note that recently "The Hospital's Commission on Beers" reported, after careful enquiry, that:—"Pale ale and stout are the most harmless and best hypnotics we possess, and are often far more efficacious in the treatment of insomnia than drugs. Precisely how these substances act we do not know, but

* The Cook's Oracle. By William Kitchiner, M.D. New Edition, London, 1827.

† Lives of Eminent Men. By John Aubrey. First published from the originals, London, 1813.

part of their action is certainly due to the hypnotic principle contained in hops, and the more heavily these beverages are hopped the more marked is their hypnotic action. An average dose for the purpose is half a pint, and this should be taken last thing at night, as long after an early dinner or supper as possible.* We need not exaggerate our responsibility in the prescription of alcohol; but we should never forget it. I have been accustomed to insist that when we use alcohol, in the form of any of the fluids which contain it, in the treatment of insomnia, we should explain to our patient the reasons for the employment of the remedy, and that we should discontinue this remedy as we discontinue the use of other drugs, when the conditions which called for its exhibition shall have disappeared.

I have found in practice that a carminative, best taken just after the patient be entered into bed for a night's sleep, is an efficient remedy in some cases of intrinsic insomnia. Such a remedy is indicated when a sense of gastrointestinal discomfort, often described by a patient as a feeling of "sinking" in the stomach, with or without flatulence, appears in any particular case to prevent sleep. A car-

* *The Hospital*, April 24th, 1909.

minative is a cheering and comforting remedy, which relieves gastro-intestinal discomfort, stomach-ache, or belly-ache, disperses and prevents flatulence, and promotes speedily a feeling of local well-being, and all this so markedly that its name may be justified either by the song of joy which it almost inspires or by a *carmen* meaning a charm as well as a tune. Oil of cajuput is a reliable remedy of this kind. In its action it is a carminative, an antispasmodic, and a diffusible stimulant. It may be given in a dose of five drops, or a little less or a little more, dropped upon a piece of lump sugar, or crumb of bread. Hot water, as a beverage, is also a carminative, diffusible stimulant, and antispasmodic, promotive of gastro-intestinal peristalsis. I have read that a well-known English statesman, now living, cured himself of sleeplessness by drinking a tumblerful of hot water, "as hot as could be drunk," before going to bed. In some of the milder gastric disturbances which dispose to insomnia a good draught of old-fashioned effervescing ginger-beer, just before getting into bed, will disperse flatulence and determine sleep; if this remedy be not at hand a teaspoonful of Worcestershire sauce in a small tumblerful of ærated water would furnish an adequate succedaneum.

In slighter cases of intrinsic insomnia some of our dormitives which are milder than the ordinary hypnotics are useful. We may now consider these, which may be regarded as adjuvant remedies, of tried adoption. Many of these remedies are what may be called popular remedies, and a remedy, like a person, is not always the worse for being popular; they are "understood of the people," and you should understand them too, for it is scarcely convenient that you should run risks of being beaten in your therapeutics of insomnia by a non-professional prescription of a remedy of this class. A drachm of the officinal tincture of hop is a good dormitive. The slumberous repute of hop attaches to its aroma. King George the Third, by the advice of his physician, slept with his head upon a hop pillow, *pulvinar lupuli*, a pillow stuffed with newly-dried hop catkins. It is recorded that such a pillow was used successfully by our King Edward VII in his severe enteric fever in 1871. Dr. Berkeley, Lord Bishop of Cloyne, records: "I have known tar-water procure sleep and compose the spirits in cruel vigils, occasioned either by sickness or by too intense application of the mind."* Tar water, made

* Siris: . . . concerning the virtues of Tar water. By the Right Rev. Dr. George Berkeley, &c., 2nd Edition. Dublin, 1744.

according to the formula of this prescribing prelate, is still to be bought from pharmacists. Amongst popular remedies for sleeplessness there are: clove-tea; cowslip wine; nutmeg-tea (nutmeg may be narcotic in large dose); fennel stalks, eaten as celery; lettuce as food, or in some of its medicinal preparations; onions, as food. What may be called the lore of these popular remedies is very interesting; you may pursue it as an instructive diversion, and as one from which you may gather points of use in medical practice.

There are many other matters to which you must give attention in the treatment of chronic psychic insomnia, if you would follow my advice that you should only give hypnotics in exceptional cases, and only when you really cannot obtain a successful result without them. I can now do little more than mention the more important of such details to you.

Some of them you will find useful in some cases, in other cases others. How best to combine them in any given case experience will teach you. Firstly, whether he sleep well or ill, the patient ought from day to day to go to bed and to get up at fixed and regular times. "Lying in bed in the morning" is not a remedy for insomnia. Healthy sleep is a rhythmic act,

and rhythmic sleep must be cultivated. The conditions for the periodic recurrence of sleep must be supplied. Patients should be taught to go to bed at a fixed time, to get up for the day nine hours afterwards, and to trust to "nature" as to whether they sleep little, much, lightly, heavily, or brokenly, or not at all, in the interval. An afternoon nap for half an hour or so after a meal, with the feet kept warm before a fire, is helpful, and I have found in practice that it conduces to, rather than hinders, better sleeping in bed at night.

U Again, daily bodily exercise in the open air, but always short of great fatigue, must be enjoined. What is called carriage exercise is better than no outdoor change at all, but walking is a far better exercise, and cycling better still, and riding on horseback the best of all. A worn and worrying man, habitually wrapt up in an absorbing torture of self-consciousness, exaggerating his subjectivities, and sleeping badly, must perforce come out of himself, and blot out his self-consciousness with the saving graces of objectivities when he mounts a cycle or a horse's back. Gardening, in the open air, not in conservatories nor in hothouses, affords good exercise, and it is very efficient in keeping up objective attention. Dwellers in towns may

find good objective employment, of a kind counteractive of insomnia, in various physical exercises and drills, in fencing with foils, and in other similar recreations, all of which you, as medical advisers, must learn to understand in their several details, so that you may prescribe them intelligently to suit the particular needs and aptitudes of individual patients; many may at least copy Archbishop Whately, who remedied the strain of his logic by splitting his logs, and give their minds a refreshing and recreative objective bent, and their muscles healthy work, by cutting up firewood.

We have already seen, in a former lecture, that the brain in sleep is relatively anæmic, there being in that state of the body a diminished supply of blood to the brain, and especially to the blood-vessels of the cortex of that organ; and that this modification of the circulation of blood in the brain is conversely changed upon awakening from sleep. For these changes in the local blood supply to occur in physiological perfection many complex circulatory processes must have their natural play, as you will know from your study of physiology. But these changes cannot happen with normal readiness and with normal completeness unless

the walls of the cerebral arteries and arterioles retain their normal elasticity, contractility, and dilatability. Arterio-sclerosis is a frequent pathological condition which impairs or destroys the muscular contractility and the elasticity of arteries and arterioles; it is a grave change especially occurring in middle and in advanced life. So far as it affects the blood-vessels of the brain it is intimately concerned in the causation of insomnia. The whole subject of the causation, effects, prevention and treatment of arterio-sclerosis is one of the greatest in medicine and far beyond the scope of this present discourse. But we must have arterio-sclerosis in our mind in the treatment of insomnia, which may depend wholly or partly upon it. For the prophylaxis of this condition, for its prevention, retardation, and amelioration many precautions and many therapeutic measures may be necessary. Our art is developing a sound physiological prophylaxis in this important regard. Upon this great and wide subject my friend Dr. Herbert French has recently worked and written, with much clearness and promise of our advancement and success. In a valuable paper he states:—"I feel certain that whatever chemical pathology may underlie arterio-sclerosis, an additional and eminently preventible

factor is an absence of what for the sake of brevity I may call sufficient arterial-gymnastics, necessitating the redistribution of blood in the various parts of the body by the active exertions of the vaso-motor neuro-muscular system. Arterial gymnastics of this kind require no very strenuous exertion, provided the movements the patient goes through are of the right kind. It is probable that the old-fashioned way of fasting periodically did good, by making a maximum variation in the calibre of the visceral blood-vessels from time to time. The beneficial effects of purgatives may possibly be attributed to a similar cause. There is no doubt that when arterio-sclerosis has reached an advanced stage, by which time all increased blood-flow through a part depends upon increased output from the heart, strenuous exercises often do harm rather than good; but short of that, the stiffened arterioles may be made less stiff, and incipient arterio-sclerosis may be obviated altogether by the adoption of regular exercises, in which respect golf is an immense boon. Sometimes when the exercises are started they do harm instead of good, through being overdone; it is therefore beneficial to have graduated and supervised tasks in some cases in addition to the ordinary daily exercise; it is in this respect that

the passive and active movements of the Schott-Nauheim treatment, coupled with massage, do so much good. The keynote to the prophylaxis—and in its earlier stages, to the treatment, and possibly, in the earliest cases, to the cure—of arterio-sclerosis, is suitable arterial exercises; that is to say, the re-establishment and maintenance of the proper activity and adaptability of the control of the blood-supply by the vaso-motor system, without the necessity for calling upon the assistance of varying activity of the heart. Probably of all the simplest exercises which do good in the prevention of arterial rigidity one of the best is that which consists in standing up after the bath in the morning, and alternately extending one's head and body backwards, and then forwards and downwards until the fingers touch the toes, whilst the knees are kept straight. If the person can alternately stand erect and stoop the head far down a dozen times in succession without producing giddiness, especially if the movements are performed fairly quickly, then it means that, in spite of the altered position of the head, the vaso-motor system is so agile that it can still vary and control the blood distribution in the body so quickly that the cerebral circulation remains approximately the same, in spite of the alterations in

attitude.”* Whatever sustains the agility of the cerebral circulation, or improves it if it be impaired, is of causal benefit in the cure of insomnia. An excellent “exercise” of this kind which I have arranged and prescribe is this: place a hand upon each knee, stoop down and regard objects behind you squarely for three seconds, then assume the erect posture suddenly; do this unto seven times, before a meal, daily.

As to sunshine, we healers welcome the present revival of the therapeutic worship of the sun. Certainly sunshine is a natural energizer, tonic, and calmative. In practice you may be sure you will find free and long daily exposure to sunshine a valuable physiological adjuvant in the cure of insomnia.

Again, many people have acquired more or less insomnia in the acquisition of the bad habit of thinking out their affairs upon getting into bed. Some patients pursue this bad practice for years, and they often conceal it or disregard it when they seek medical help for sleeplessness.

* The vaso-motor factor in the causation and treatment of high blood-pressure. By Herbert French, M.A., M.D. (Oxon), F.R.C.P., Assistant Physician and Lecturer at Guy's Hospital. Reprinted from *The Clinical Journal*, July 5th, 1911.

In such a case you must find out this bad habit, and break your patient of it, for the cure of insomnia. Evoke the patient's self-control in this regard. In such cases especially, and in the cure of insomnia generally, people who find it difficult to get off to sleep have been advised to count monotonously, one, two, three, up to a thousand or more, until they fall asleep; to picture some familiar scene and keep the mind fixed upon it; to repeat the letters of the alphabet over and over again. The late Dr. Pereira gave some interesting illustrations of the well-known fact that a continued repetition of monotonous impressions on the senses of hearing, seeing, or touch, are provocative of sleep. One passage from his monumental work on remedies I may quote to you. Speaking of monotonous impressions in the therapeutics of insomnia, he wrote:—"This is the principle of 'the method of procuring sound and refreshing slumber at will' recommended by the late Mr. Gardner, who called himself the hypnologist. His method was for some time kept secret, and was first made public by Dr. Binns. It is as follows: Let the patient 'turn on his right side, place his head comfortably on the pillow, so that it exactly occupies the angle a line drawn from the head to the shoulder would form, and then,

slightly closing the lips, take rather a full inspiration, breathing as much as he possibly can through the nostrils. This, however, is not absolutely necessary, as some persons always breathe through their mouths during sleep, and rest as sound as those who do not. Having taken a full inspiration, the lungs are then to be left to their own action; that is, the respiration is neither to be accelerated nor retarded too much; but a very full inspiration must be taken. The attention must now be fixed upon the action in which the patient is engaged. He must depict to himself that he sees the breath passing from his nostrils in a continuous stream, and the very instant he brings his mind to conceive this apart from all other ideas, he sleeps. 'The instant the mind is brought to the contemplation of a single sensation, that instant the sensorium abdicates the throne, and the hypnotic faculty steepes it in oblivion.' '* Here is the use of a new and transient subject of consciousness, as substitutive of that which by its fixity and repetition was preventing sleep. Similarly, Dr. Horace Dobell has devised a prescription which he has found very successful in procuring sleep for his patients, namely, "instead of shutting the eyes as people generally do when they want

* Elements of Materia Medica.

to go to sleep, let the patient be ordered to strive to keep them open to the last possible moment. It is surprising how often they will then close in sleep in spite of every effort to keep them open.”* Again, as I saw shrewdly put lately, “determine to remain awake all night; you will soon find yourself dozing.” These various methods seem to be devices for changing the current of conscious cerebration. Amongst my patients I have found the plan of taking deep inspirations commended by many of them. But for the most part these expedients succeed for a night or two only, and they can scarcely be relied upon either exclusively or long. These sundry practices may even keep up wakefulness; when the mind attends to them too closely, they may sustain the self-consciousness which keeps the brain from slipping into slumber. To try hard to go to sleep is often the surest way to keep awake. We do many things best when we forget ourselves, and going to sleep is no exception to the rule.

The pillow of an insomniac's bed should be neither too high nor too low. The pillow should be “arranged” so that the sleeper's head does not fall upon his chest in deep sleep, or he will

* A letter on sleep and want of sleep. *The British Medical Journal*, March 13th, 1909.

soon be awakened: he must keep his chin off his chest. If the head be thrown too far forwards, the venous return from the brain is obstructed, and the patient is awakened by vivid dreaming and by "thumping" at the back of his head.

Again, to promote the sleep of a person in bed, you should make sure that the bedclothes which cover him are sufficient and not excessive. If the covering bedclothes be especially arranged in quantity each night by thermometric guidance, according to the temperature of the air in the patient's bedroom, so as to secure that the thickness of the upper bedclothes will give to the occupant of the bed a general feeling of sleep-inducing and sleep-sustaining comfort, and not of sleep-preventing discomfort, either from local or from general chilliness or from local or from general over-heating, sleep will be powerfully promoted. And, further, if such arrangements be made with the knowledge and with the interested approval of the patient, or by himself, we gain the valuable adjuvant of his self-confidence as to his sleeping well, and establish in his mind for the particular night before him a happy expectation which is likely to be realised. For your guidance as to the details of practice arising from this indication of treat-

ment, I may tell you that, from observations I have made, I have found that in a large bedroom in the middle of a large house, with a window of the room always kept open, a Fahrenheit thermometer indicated a temperature of 70°, or upwards, in the hottest weather, and of 40°, or less, in the coldest weather, in the country, at an elevation of about 300 feet above the sea-level, in mid-England. At a temperature of 44°, the upper bedclothing should consist of a sheet, three blankets, a light counterpane, and a light small blanket, this last not "turned over" at the upper edge of the bedclothing and not "turned in at the bottom"; at a temperature of 70°, it should be a sheet only. Between these extremes of temperature the changes in the thickness of the covering bedclothes should be gradual. These extremes should be the ends of a series of gradations passing through about nine terms. With a little care you can make a serviceable thermometric register, marking the suitable bedclothing for a given temperature of the bedroom in any particular case, and so you may cure intrinsic insomnia, and prevent its recurrence.

The head of the bed should be away from a wall; and it should be towards the east: "move eastward happy earth." We are often

asked for direction by patients as to the latter point, and we may think that this eastward position would tend to prevent cerebral hyperæmia.

In all cases, the bedroom window should be open all night and all the year round, and arranged so that it may be so without draught. Insufficient ventilation causes awakening from sleep, just as do noises, light, and too great heat or too much cold.

The best bed on which to lie is a hair mattress, covered with a sheet and a blanket, and supported upon a chain stretcher. As to the position of the body in decubitus which helps sleeping patients may inquire of you for guidance. Remember that "nature" disposes us towards sleep after a full meal; if we lie down and yield to her solicitation one instinctively lies upon the right side. Dextral decubitus is the best position for the former half of a night's sleep, as favouring the progress of their contents through the stomach and the small intestine; sinistral decubitus for the latter half of the night, as helping fæcal progress through the large intestine, towards a matutinal call from the rectum for defæcation.

In some cases a little food taken just at the time for sleeping is an efficient soporific. You may often observe that the good effects of a

little nourishment—a cup of “cocoa,”* or a small piece of dry bread, or of ginger-bread or ginger-bread biscuits when such homely carminative is indicated, taken upon getting into bed or upon awakening after a slumber which is too short for a night’s rest, are most happy.

You may usefully remember that sleep may often be induced by the temporary application of cold to the head or to the general surface of the body. A person who has been lying awake will often fall asleep at once upon regaining his bed after getting out of bed and sousing his head, neck, and hands in cold water, or after following Charles Dickens’s plan of standing at his

* “Cocoa” is an arbitrary preparation, “said to be made from the fragments of the seed-coats mixed with portions of the kernels (of *Theobroma Cacao*).” (Pareira.) I have instructed Messrs. Southall, the well-known pharmacists, to prepare what our faculty would deem to be the best kind of “cocoa,” namely, what may be regarded as a kind of “whole meal” cocoa, it being a preparation which furnishes the whole of the constituents of the seeds of *theobroma cacao*, (the nuclei cacao,) exactly in the proportions furnished by nature; when this meal is indicated to your selection you may prescribe it as farina theobromæ. Pareira taught that “cocoa” is somewhat constipating; this farina, by retaining the natural fat of the seed, would obviate such effect. I have found a ready and reliable test for what we may call the whole-mealedness of an ensample of this farina; in that a pinch of it should be sufficiently oleaginous to allow of its being worked up by fingers in the palm of a hand into a pilular consistency.

bedside until he feels chilly, and thereupon shaking up and cooling his pillows and bed-clothes, and then getting into bed. To illustrate this point further, a passage of great authority in Aubrey's contemporaneous biography of William Harvey, (1578-1657,) the discoverer of the circulation of the blood in man, may be quoted:—"He was hott-headed, and his thoughts working would many times keep him from sleeping; he told me, that then his way was, to rise out of his bed, and walk about his chamber in his shirt, till he was pretty coole, *i.e.* till he began to have a horror,* and then return to his bed, and sleep very comfortably."† What a pity Harvey, who learned and who taught so much, did not learn the habit of ceasing to "work" his thoughts some time before he went to bed, so that he might have lived more happily and longer! A patient told me that the successful effect of getting out of bed for a while to break his insomnia was much helped by stamping his feet upon a hard floor until they "burn."

Patients suffering from insomnia recover normal sleep more quickly under frequent interviews with their medical adviser than when such

* Shiver.

† Aubrey's "Lives." *Op. cit.*

meetings are "few and far between," because a member of our faculty who is experienced in practice amongst such patients becomes fertile in the judicious application of therapeutic suggestion; for example, in suggesting that a remedy he is about to exhibit will either produce sleep forthwith or render the absence of sleep innocuous. Insomniacs often recover healthy sleep in gaining the persuasion that their insomnia is harmless. The psychic cause of insomnia is often an exaggerated fear of the effects of insomnia. In some cases of psychic insomnia, two or three years of gentle, firm, and sympathetic discipline, under the skilful and patient care and guidance of a medical man of experience as to such sufferers, is most useful in teaching and developing the control of those neurotisms of the nervous temperament which are causal as to insomnia; the severer cases might do best to live in a doctor's house with him in his family.

Everybody is a little superstitious about something. Sometimes a patient hugs a harmless and even helpful superstition about his sleeping. Let him hug it; do not try to reason him out of it. The therapeutics of superstition is worth our consideration. It sometimes has its uses in medical practice, especially in a case in

which mental depression is associated with insomnia. "Un homme n'est pas tout à fait miserable quand il est superstitieux" truly wrote a great Frenchman.* A wise physician lets his neurotics keep those of their superstitions which he can turn to therapeutic uses for them.

Another word as to self-discipline in insomnia: it is here in the words of a great surgeon who might have been a great physician: — "It is common to hear healthy people say, and sometimes as if it were praiseworthy, that they cannot sleep on this side or that, or without a pillow or some such help. In some of these there may be just reason for their defect, but in the greater number it is a mere habit grown out of a want of will to resist some discomfort. If such people would resolutely pass some hours, or a night or two, without sleep, their fatigue would ensure them sleep in any posture whatever."† Your experience in practice will soon teach you to recognise the cases in which this consideration should be urged.

In the toxic kinds of insomnia we must especially endeavour, as I have already sug-

* Honoré de Balsac in his "Peau de chagrin."

† The use of the will for health. By Sir James Paget, Bart.

gested to you, to act upon the maxim, "*Cessante causâ cessat et effectus.*" We must stop or lessen the consumption of tobacco, alcohol, tea, etc., as the case may be. The sufferer from toxic insomnia will ask you what must be done for sleep. This is not quite the question; the question is not what the patient must do, but rather what the patient must not do. The consumption of something must be left off. When you have found out the what and when of that something, the patient's self-control, loyal co-operation, and obedience to your directions are essential to your curing the case. A discussion of the treatment of gouty insomnia, and of the sleeplessness arising in some chronic kidney diseases, would involve a consideration of the whole question of the therapeutics of the maladies upon which these forms of wakefulness depend. If you find evidence of copræmia in a case of insomnia, you must, in any case, treat the underlying fæcal retention. Such fæcal retention may be the whole cause, or an active part of the cause, of the insomnia. This is one of the causal relations of insomnia which yields readily to evacuant treatment. Note, for example, that Dr. Naylor, writing of the faulty sleeping which depends upon "the retention of waste products," testifies to the advantages of

“a free clearing out of the emunctories, the bowels, and kidneys at the same time by a dose of about 2 grains or 3 grains of calomel, a drug which acts simultaneously on them both. I have often in my practice found a dose of calomel about three times a week enable the patient to sleep well and rid him of his imagined woes and dreams, while at the same time he has been dieted.”* As to the value of calomel, from another point of view, in the treatment of insomnia, Dr. Huchard, the eminent physician in Paris, lately declared that, the administration of one-tenth of a grain of calomel three times a day was often enough to gradually restore the habit of sleep in cases of high arterial tension, probably dependent on imperfect metabolism.†

Senile insomnia is very obstinate. Perhaps in the bromides, with full doses of hop or of henbane, we have the most efficient and least harmful medicinal means of relief; while the promotion of sleep may be accomplished by an intelligent combination of some of the non-medicinal measures to which I have referred.

In some cases of insomnia, counter-irritation, by a pustulant, kept up for a few days or longer,

* Of St. Kilda, Victoria, in *The British Medical Journal*, June 11th, 1909.

† Meeting of British Medical Association.

until the insomnia yield to the treatment, is successful, applied to the nape of the neck, to the nuchal region, over the occiput, or over the whole of the hairy scalp. It is a good local derivative, easing pain and intra-cranial hyperæmia, and it will be found in practice to present some further advantages of a disciplinary nature. I think I have discovered that dull and prolonged nuchal and occipital pain is pathognomonic, when found with psychic insomnia, of worry of financial origin. An efficient pustulant may be formed of one part of powdered ipecacuanha, one part of croton liniment, and two parts of benzoated lard, rubbed together to form an ointment, of which a portion of the size of a hazel kernel should be rubbed into the skin of the surface you select, for five minutes, night and morning, until pustulation be produced; when a local pyorrhœa shall become established less frequent applications will sustain this curative effect, as occasion may require.

Again, as to senile insomnia, senility is a relative term, and with much truth it may be said "a man is as old as his arteries." In such form of wakefulness, arterial exercises, under medical approval, may be more important than any other single measure, as Dr. Herbert French

has pointed out in the therapeutics of arteriosclerosis at large.* Besides the prophylactic employment of such activities, he finds that in less extreme cases of arterial induration graduated exercise may restore some of the lost elasticity, contractility, alertness and lissomeness of arterial walls, so that the blood-pressure may be abated by some restoration of the vaso-motor factor, in balancing the distribution of the blood in relation to local functional activities.

Motoring, best in an open car, is powerfully curative, especially in psychic, toxic, or senile insomnia in exhausted patients.

Sleeplessness in a child has some peculiar features, causal and curative. These were well made clear by Dr. Cassel,† and his paper would repay your study of it when you wish to pursue further the subject of infantile insomnia. During the first few weeks of life a baby only awakens when it is uncomfortable, as from feeling cold, or hot, getting wet, or from thirst or hunger, or from a scratching pin, a tight band, or a covered face; the discomfort removed, the infant sleeps again. For the first three months the infant mostly

* *Op. cit.*

† *Deut. Med. Woch.*, September 6th, 1906; excerpted in *The British Medical Journal*, November 10th, 1906.

sleeps, then times of waking lengthen, until by the end of the first year a few hours of daily awakenedness are attained. By the end of the second year a child should sleep during twelve hours at night and from one and a half to two hours by day. By the fourth or fifth year the day sleep may be much shortened or omitted; until puberty from nine to eleven hours of sleep are well at night. Of course, all the causes of symptomatic insomnia must be recollected in the treatment of the malady in infants; but especially with them. Recall traumatism, belly-ache, skin affections, cough, diarrhœa, difficulty of breathing, rickets, tetany, epilepsy, fevers, headache, nasal obstruction from adenoid growths, masturbation, mental defects, mismanagement by a nervous parent or nurse, and examine the ears, the eyes, the urine and the anus. Symptomatic insomnia soon yields to causal treatment. In psychic cases, every detail of hygiene, of physiological propriety, and of example must be adjusted with individual regard to the features of each case. Hypnotics are seldom indicated. To get a child "off" to sleep, a warm bath, and quickly to bed, imperfect darkness, quiet, the presence of a familiar and trusted attendant, holding one of the child's hands with-

out restraining it, a "good night" kiss, and a monotonous and low-pitched "cradle song" have signal uses in practice.

Now I must close our consideration of this interesting subject of the therapeutics of intrinsic insomnia. I have sketched broad outlines for your guidance, which will suggest to you many other details in your practice. That the best physician is the physician who is the best inspirer of hope, Coleridge it was, I think, who so declared. He was largely right. Of course, truthful hope, and hope of the true kind, a cheerful and abiding expectation of success. Certainly is this largely true in nervous maladies. In the cure of intrinsic insomnia, especially, the best physician is one who is a master of his art and withal the most ingenious inspirer of his patient's desire of cure and belief that it is obtainable. Perhaps no other maladies demand a greater scope of therapeutic resources. The best physician in these cases is he who knows how to vary, with "infinite variety," the adaptation of efficient drugs to meet the infinite varieties of individual cases, and who is the most adroit inspirer and sustainer of hope—adroit, à droit. In insomnia, as indeed in the treatment of every malady, it is for one of us, medical men or women, to make the patient "better." This

must be your unwearied work, done in brightness and with interest, ever remembering that the joys of a pathological diagnosis are a very acquired taste, and one of the medical mind only, while the victories of therapeutics need but the common love of life and ease for our appreciation of them. To the sick each of you must be an aid-bearer; of us was it written, "*opiferque per orbem dicor.*"*

* Ovid, M. I., 521. Anciently chosen for the armorial motto of the Worshipful Society of Apothecaries.

III.

PRACTICAL SUMMARY OF THE PHYSIOLOGY, PATHOLOGY, ETIOLOGY, VARIETIES AND TREATMENT OF INSOMNIA.*

Physiology of sleep.—*Symptomatic insomnia.*—
Intrinsic insomnia: psychic, toxic, and senile.—
Causal treatment. — *Potassium bromide.* —
Opium.—*Chloral.*—*Combination of hypnotics.*—
Chloralamide. — *Sulphonal.* — *Paraldehyde.* —
Veronal. — *Alcohol.* — *Saline eliminants.* —
Laxatives.

INSOMNIA.—Two distinct vital changes occur in sleep. These changes are associated, and are related to each other. One, as has been proved by experiment, is a diminished supply of blood to the brain, and especially to the blood-

* An article from my pen in *An Index of Treatment* by various writers, edited by Robert Hutchison, M.D., F.R.C.P., Physician to the London Hospital, &c., and H. Stansfield Collier, F.R.C.S., Surgeon to St. Mary's Hospital, &c.; Bristol, John Wright and Sons, and in London and New York; 6th Edition, 1911, p. 1039, which article is reproduced here, as the best summary I can give of insomnia, by the generous permission of Dr. Hutchison and of Messrs. John Wright and Sons, to whom I offer my grateful thanks.

vessels of the cerebral cortex. The other change, the precise characters of which are as yet unknown, is some essential and intrinsic change in the brain—and probably also in the spinal cord and the ganglionic nervous system—of the nature of a functional depression of those parts, and especially of the cerebral cells, and arising from an accumulation in the affected organs of some of the products of normal tissue waste. It is very probable that for normal sleep an intrinsic change of this kind must gain the wide distribution here indicated, that this change is rhythmic in its occurrence, and is sustained by the physiological effects of some of the issuants of those muscular and nervous tissue changes which especially occur in the active, waking state of the body. The whole living body sleeps. The changes which the event of sleep declares, extend beyond mere interruption of consciousness; they extend to secretion, to the action of the heart and blood-vessels in the general circulation of the blood, to respiration, to nerve reflexes, and to all the tissue modifications and all the functional activities concerned therein.

In insomnia, sleep is absent or imperfect; there is inability to sleep at all, or long enough, or at a convenient time. Insomnia is a concomitant of some forms of unsoundness of mind.

Besides such mental sleeplessness, cases of insomnia, as met with in practice, divide themselves naturally into two groups, namely, (1) *Symptomatic insomnia*, and (2) *Intrinsic insomnia*.

1. SYMPTOMATIC INSOMNIA attends a vast variety of morbid states, and is secondary to them, or is part of them. Pain, if severe enough, and from whatever cause arising; pyrexial elevation of temperature; frequent coughing, such as often occurs in pulmonary consumption; dyspnoea, such, for instance, as results from obstructive dilatation of the cardiac cavities and appears to require an extraordinary vigilance of the nervous centres for the maintenance of the vital processes of respiration and circulation—are clinical conditions of disease which may prevent, shorten, or break up sleep. Such conditions are frequently met with in medical practice, as single or conjoint causes of insomnia, in various combinations. In such and in similar instances the cause of the sleeplessness is obvious, and the consequential character of the insomnia—that is, its dependence upon a distinct and sufficient cause—is clear. For the therapeutic control of this kind of insomnia we may employ with success one of two curative methods, or we may employ a judicious com-

bination of these methods, such combination being founded upon a skilled appreciation of the especial needs of each individual case. That is to say, we may control sleeplessness of the kind in question either by the exhibition of remedies which directly cause sleep—hypnotics or soporifics—or by the employment of measures which combat the cause of the insomnia, by removing pain, by reducing pyrexia, quelling cough, relieving cardiac disturbance and dyspnœal discomfort, and so on; or by using in conjunction hypnotics and remedies for the removal of the causes of the sleeplessness. In symptomatic insomnia, as in medical practice generally, it is best to regard the therapeutic indications of each case from the well-known standpoints, respectively, of the *indicatio causalis*, of the *indicatio morbi*, and of the *indicatio symptomatica*. The treatment of the sleeplessness of the secondary insomnia arising from pain, pyrexia, dyspnœa, and from other morbid conditions, is part of the treatment of a large number of diseases, and is given in other articles. If a hypnotic drug be needed in such a case, one of those described later may be selected. It must always be remembered that preparations of opium are contra-indicated, as a rule, in renal diseases and in bronchitis.

2. INTRINSIC INSOMNIA.—These cases fall naturally, as to their causes, into three divisions, the *psychic*, the *toxic*, and the *senile*. In psychic insomnia, some severe mental shock or long-continued mental strain (such as financial worry or hard reading for an examination) has excited or kept up such relative cerebral hyperæmia that insomnia results. In toxic insomnia, some ingested agent, as in alcoholism, or in excessive smoking of tobacco or snuff-taking, or as in the drinking of strong tea or coffee near bedtime, or some autogenetic poisons such as arise in the gouty diathesis, in renal insufficiency, or in habitual constipation, keep up sufficient cerebral hyperæmia for the production of insomnia. In senile insomnia, the broken and short sleep is the result of senile degeneration of the smaller cerebral arteries. In such degeneration, those blood-vessels are less elastic and contractile than in health, and they may become dilated, so that the blood-supply to the cerebral cortex is with difficulty reduced enough to permit of sleep.

Patients who are sleepless without physical discomfort, are usually those of nervous temperament, and their impressionability as to insomnia is determined by psychic or toxic causes, or by senile changes in the cerebral blood-supply, or by these conditions in various combinations.

TREATMENT.—As a rule, successful treatment follows the discovery of its cause. A hypnotic should be prescribed only in exceptional cases, and when its exhibition cannot be avoided. A removable cause of insomnia should never be allowed to continue. In the severer forms of psychic insomnia, the prompt use of a hypnotic will soon restore to the brain the power of sleeping, without further aid from drugs.

Potassium bromide is the best hypnotic in well-nourished patients and in the slighter cases generally. It produces nervous calm, is a direct brain sedative, and quite safe. It must be given in a full dose after getting into bed, 30-60 grains dissolved in half a tumblerful of water.

Opium, or one of its hypnotic derivatives, may be given, especially when pain prevents sleep; but is contra-indicated in bronchitis, and in renal disease; is given with extreme caution to children; it is unsuitable for habitual cases, and its exhibition should not be long continued, or its dosage much increased. In severe psychic cases it may act well, thus prescribed:—

R *Pilulæ Saponis Compositæ* gr ijss

Ft. pil. One or two to be taken at bedtime.

Chloral is the hypnotic most used, and it is certain in its action. Its disadvantages are,

that sometimes it is a gastric irritant, it is a cardiac depressant, undesirable in heart-disease or with a low blood-pressure, and the habit of taking chloral, which is a prevalent vice, may be induced. The officinal syrup of chloral hydrate is a good preparation. Each fluid drachm of the syrup contains 10 grains of chloral hydrate. From $\frac{1}{2}$ -2 drachms of this syrup may be given at bedtime in a wineglassful of dill, peppermint, or other aromatic water, and repeated in a half dose in two or three hours, if necessary.

A combination of hypnotics is sometimes more successful than any of them singly; in such combination each acts better in a smaller dose than otherwise. Chloral and bromide of sodium or of potassium may be given together; or both may be combined with opium, thus:—

R Tincturæ Opii	℥ v-x
Potassii Bromidi	gr x-xx
Syrupi Chloral	℥ ss
Aquæ Ment hæ Piperitæ	q. s. ad ℥ iss
M. Ft. haust. To be taken at bedtime.	

Chloralamide is especially recommended in insomnia complicating disease of the heart. In such cases Dr. Hale White advises 25 grains dissolved by stirring in 1 ounce of brandy, adding water to taste, taken about one hour before bedtime. On account of its disagreeable taste it

is sometimes proposed that chloralamide should be administered in capsules; but if the drug be given as a powder, it may be very slow in its action, and cause a drowsy day after a sleepless night.

Sulphonal, and its chemical allies, *tetronal* and *trional*, are powerful hypnotics, which do not depress the heart nor irritate the stomach. None of them is safe if the kidneys be diseased, as each may cause hæmatoporphyrinuria. Each has the disadvantage of being comparatively insoluble in water, and their insolubility may retard their effect for some hours after they have been taken by the mouth. None of them should be administered for more than a few nights consecutively. While one of them is being taken, 20-30 grains sodium bicarbonate should be given during the day, to prevent the urinary hyperacidity which these hypnotics cause by their action upon the blood. Each of these drugs is best given in a cachet, washed down with a little hot water, one hour before bedtime. The dose of sulphonal is 10-30 grains; tetronal, 10-20 grains; trional, 15-30 grains.

Paraldehyde is a good hypnotic. It is a colourless liquid with ethereal odour and pungent taste, soluble 1-8½ of water. It is best given emulsified with yolk of egg. It acts

quickly, and does not depress the heart. The dose is from $\frac{1}{2}$ -2 fluid drachms. It has an unpleasant after-effect. For days after a single dose, a disagreeable smell is given to the patient's breath.

Veronal is a good hypnotic. It is a white crystalline powder, comparatively insoluble in water (1-160). It is cautiously given in cachets and in pills, for which latter, syrup of glucose is a good excipient. The dose is 3-15 grains.

In many cases of chronic wakefulness from prolonged mental strain, the patient is anæmic. The insomnia cannot be cured unless the anæmia be cured. Hæmatinics are indicated, of which the best are iron and arsenic, singly or combined. The diet must be generous, containing plenty of fish, meat, and eggs.

The prescription of alcohol as a remedy in disease is often difficult and sometimes dangerous. To many people a "nightcap" of toddy is a superfluous, perhaps hurtful, luxury. It gives, however, better than anything else, rest and sleep to the worried brain of feeble persons whose blood is poor. Alcohol is the best hypnotic in many cases of chronic psychic insomnia, when the patient is worried and weakly, sorrowful and anæmic. When alcohol is prescribed in the form of any of the fluids which

contain it, in the treatment of insomnia, the reasons for the employment of the remedy should be explained, and it should be discontinued when the conditions which called for its exhibition have disappeared.

In the toxic kinds of insomnia, if the cause be the consumption of tobacco, alcohol, tea, or coffee, such consumption must be stopped or lessened, as the case may be. In the toxic insomnia of gout, or of chronic kidney disease, with a pulse of high tension, the following combination is useful:—

R Magnesii Sulphatis Effervesc.	℥ ss
Sodii Potassii Tartratis	℥ j
Sodii Citro-Tartratis Effervesc.	℥ ss
M. Ft. pulv.	One or two teaspoonfuls to be
taken in half a tumblerful of water every	
morning, before breakfast.	

In the toxic insomnia which sometimes accompanies habitual constipation and undue fæcal retention, and of which such fæcal retention may be the whole cause, the cure of the habitual constipation must be aimed at. If laxative drugs be necessary, the following modification of Marshall Hall's pill is useful:—

R Aloes Barb.
Theriace
Extracti Glycyrrhizæ
Extracti Taraxaci
Saponis Mollis, singulorum partes æquales
Solve in aqua, et calore lente inspisse; deinde divide
in pilulas, pondere 2½ gr. One or two pills to be taken
at bedtime.

As a mild laxative, the following combination of remedies has proved excellent:—

R Magnesii Ponderosi

Olei Ricini

āā ʒss

Mellis Depurati

ʒj

M. Ft. conf. One teaspoonful to be taken at bedtime.

Senile insomnia is very obstinate. One of the hypnotics before mentioned may be given, with exceptional caution as to dosage. In many cases the bromides, with full doses of hop or of henbane, afford the most efficient and least harmful medicinal means of relief.

JAMES SAWYER.

Now I ought to make two additions to the foregoing article: 1, a hypnotic which may be fatal in an excessive dose may be fatal in an ordinary dose in a person who takes it habitually, by a kind of cumulative effect; 2, in senile insomnia arterial gymnastics may be indicated.

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